

## *Health Consultation*

# **Evaluation of Contaminants in a School and Residential Domestic Well near the Wolph's Second-Hand Store Site: Olympia, Thurston County, Washington**

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Prepared by

Washington State Department of Health  
Under Cooperative Agreement with the  
Agency for Toxic Substances and Disease Registry



## **Foreword**

The Washington State Department of Health (DOH) has prepared this Health Consultation in cooperation with the Agency for Toxic Substances Disease Registry (ATSDR). ATSDR is part of the U.S. Department of Health and Human Services, and is the principal federal public health agency responsible for health issues related to hazardous waste. This Health Consultation was prepared in accordance with methodologies and guidelines developed by ATSDR.

The purpose of this Health Consultation is to identify and prevent harmful human health effects resulting from exposure to hazardous substances in the environment. The Health Consultation allows DOH to respond to a request from agencies and concerned residents for health information on hazardous substances. It provides advice on specific public health issues. DOH evaluates available environmental sampling data, determines whether exposures have occurred or could occur, reports any potential harmful effects, and recommends actions to protect public health.

For additional information, or questions regarding DOH, ATSDR, or the contents of this Health Consultation, please contact the Health Assessor who prepared this document:

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## **Glossary**

<b>Acute</b>	Occurring over a short period of time. An acute exposure is one which lasts for less than 2 weeks.
<b>Agency for Toxic Substances and Disease Registry (ATSDR)</b>	The principal federal public health agency involved with hazardous waste issues, responsible for preventing or reducing the harmful effects of exposure to hazardous substances on human health and quality of life. ATSDR is part of the U.S. Department of Health and Human Services.
<b>Aquifer</b>	An underground formation composed of materials such as sand, soil, or gravel that can store and/or supply groundwater to wells and springs.
<b>Carcinogen</b>	Any substance that can cause or contribute to the production of cancer.
<b>Chronic</b>	A long period of time. A chronic exposure is one which lasts for a year or longer.
<b>Comparison value</b>	A concentration of a chemical in soil, air or water that, if exceeded, requires further evaluation as a contaminant of potential health concern. The terms comparison value and screening level are often used synonymously.
<b>Contaminant</b>	Any chemical that exists in the environment or living organisms that is not normally found there.
<b>Dose</b>	A dose is the amount of a substance that gets into the body through ingestion, skin absorption or inhalation. It is calculated per kilogram of body weight per day.
<b>Exposure</b>	Contact with a chemical by swallowing, by breathing, or by direct contact (such as through the skin or eyes). Exposure may be short-term (acute) or long-term (chronic).
<b>Groundwater</b>	Water found underground that fills pores between materials such as sand, soil, or gravel. In aquifers, groundwater often occurs in quantities where it can be used for drinking water, irrigation, and other purposes.
<b>Hazardous substance</b>	Any material that poses a threat to public health and/or the environment. Typical hazardous substances are materials that are toxic, corrosive, ignitable, explosive, or chemically reactive.

<b>Maximum Contaminant Level (MCL)</b>	A drinking water regulation established by the federal Safe Drinking Water Act. It is the maximum permissible concentration of a contaminant in water that is delivered to the free flowing outlet of the ultimate user of a public water system. MCLs are enforceable standards.
<b>Media</b>	Soil, water, air, plants, animals, or any other part of the environment that can contain contaminants.
<b>Model Toxics Control Act (MTCA)</b>	The hazardous waste cleanup law for Washington State.
<b>Monitoring wells</b>	Special wells drilled at locations on or off a hazardous waste site so water can be sampled at selected depths and studied to determine the movement of groundwater and the amount, distribution, and type of contaminant.
<b>No apparent public health hazard</b>	Sites where human exposure to contaminated media is occurring or has occurred in the past, but the exposure is below a level of health hazard.
<b>No public health hazard</b>	Sites for which data indicate no current or past exposure or no potential for exposure and therefore no health hazard.
<b>Oral Reference Dose (RfD)</b>	An amount of chemical ingested into the body (i.e., dose) below which health effects are not expected. RfDs are published by EPA.
<b>Organic</b>	Compounds composed of carbon, including materials such as solvents, oils, and pesticides which are not easily dissolved in water.
<b>Parts per billion (ppb)/Parts per million (ppm)</b>	Units commonly used to express low concentrations of contaminants. For example, 1 ounce of trichloroethylene (TCE) in 1 million ounces of water is 1 ppm. 1 ounce of TCE in 1 billion ounces of water is 1 ppb. If one drop of TCE is mixed in a competition size swimming pool, the water will contain about 1 ppb of TCE.
<b>Plume</b>	An area of contaminants in a specific media such as groundwater.
<b>Reference Dose Media Evaluation Guide (RMEG)</b>	A concentration in air, soil, or water below which adverse non-cancer health effects are not expected to occur. The EMEG is a <i>comparison value</i> used to select contaminants of potential health concern and is based on EPA's oral reference dose (RfD).

<b>Risk</b>	The probability that something will cause injury, linked with the potential severity of that injury. Risk is usually indicated by how many extra cancers may appear in a group of people who are exposed to a particular substance at a given concentration, in a particular pathway, and for a specified period of time. For example, a 1%, or 1 in 100 risk indicates that for 100 people who may be exposed, 1 person may experience cancer as a result of the exposure.
<b>Route of exposure</b>	The way in which a person may contact a chemical substance that includes ingestion, skin contact and breathing.
<b>U.S. Environmental Protection Agency (EPA)</b>	Established in 1970 to bring together parts of various government agencies involved with the control of pollution.
<b>Volatile organic compound (VOC)</b>	An organic (carbon-containing) compound that evaporates (volatilizes) easily at room temperature. A significant number of the VOCs are commonly used as solvents.

## **Background and Statement of Issues**

This health consultation was prepared at the request of the Washington State Department of Ecology (Ecology) to evaluate contamination detected in two drinking water wells located near Olympia, Thurston County, Washington. The Washington State Department of Health (DOH) evaluated the results of water samples collected on April 20, 2000, by a representative of the Thurston County Health Department (TCHD). The (DOH) prepares health consultations under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR).

Two residential drinking water wells were identified by TCHD as potentially at risk because of their proximity to the Wolph's Secondhand Store site (site) near Olympia, Washington. Previous Ecology and EPA investigations at the site have revealed low levels of semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides, and lead in the soil, and low levels of SVOCs and one pesticide in the groundwater. The site was recently delisted by Ecology. At the request of two area residents during the delisting comment period, Ecology collected water samples from their drinking water wells in January 2000. A detailed description of the site, including the site background, regulatory history, environmental sampling results, and an evaluation of human health risks associated with the detected contaminants is located in the June 2000, Health Consultation report prepared by DOH.

Although the results of previous investigations revealed only low levels of contaminants at the site, TCHD collected samples from a residential drinking water well and a school water supply well on April 20, 2000, to ensure that these wells were not being impacted by contaminants from the Wolph's site. The residential well is a private well that serves a residence/business adjacent to the site, and the school well is a Group A water system that serves the Griffin school<sup>a</sup>, located just east (hydraulically downgradient) of the Wolph's site, across Highway 101 (Figure 1, Appendix A). The water samples were tested for VOCs (EPA method 8260), SVOCs (EPA method 8270), pesticides/herbicides (EPA method 8081), lead, and copper (EPA method 6020). This Health Consultation evaluates the public health implications from actual or potential exposure to the detected contaminants (Tables 1 and 2 are located in the Appendix).

## **Discussion**

Site environmental sampling data were screened using federal (ATSDR and EPA), and state (MTCA method B) health-based criteria (comparison values). Comparison values are media-specific concentrations used to select environmental contaminants for further evaluation. Contaminant concentrations below comparison values are unlikely to pose a health threat, and were not further evaluated in this health consultation. Contaminant concentrations exceeding

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<sup>a</sup> There were originally two wells (sources) that serviced the Griffin School. Currently, only Source # 2 is used. No VOCs were detected during the October 1997 and August 2000 sampling events. Nitrate was detected in a 1997 test, but below a level of health concern (1.9 mg/l), and lead and copper were not detected during a 1998 test (Personal communication with Vicki O'Rourke, DOH Drinking Water Division, April 5, 2000).

comparison values do not necessarily pose a health threat, but were further evaluated to determine whether they are at levels which could result in adverse human health effects.

*None of the detected contaminants exceeded available health comparison values.* However there was no health comparison value available for phenanthrene. The highest concentration of phenanthrene (0.095 ug/l) was found in the Griffin School well. Since a health comparison value for phenanthrene is not available, it was compared to the Child RMEG for pyrene, 300 ug/L. This is justifiable because pyrene is the PAH which is considered the most toxic non-carcinogenic PAH.

### *Multiple Chemical Exposure*

A person can be exposed by more than one pathway and to more than one chemical. Exposure to multiple pathways occur when a contaminant is present in more than one medium (i.e., air, soil, surface water, groundwater, and sediment). For example, the dose of a contaminant received from drinking water may be combined with the dose received from contact with that same contaminant in soil. Since all detected contaminants were well below health comparison values, the combined effect of exposure to the contaminants would not be expected to result in adverse health effects.

### *Child Health Initiative: Developmental/Reproductive Effects*

ATSDR's Child Health Initiative recognizes that the unique vulnerabilities of infants and children deserve special emphasis with regard to exposures to environmental contaminants. Infants, young children, and the unborn may be at greater risk than adults from exposure to particular contaminants. Exposure during key periods of growth and development may lead to malformation of organs (teratogenesis), disruption of function, and even premature death. In certain instances, maternal exposure, via the placenta, could adversely effect the fetus.

After birth, children may receive greater exposures to environmental contaminants than adults. Children are often more likely to be exposed to contaminants from playing outdoors, ingesting food that has come into contact with hazardous substances, or breathing soil and dust. Pound for pound body weight, children drink more water, eat more food, and breathe more air than adults. For example, in the United States, children in the first 6 months of life drink 7 times as much water per pound as the average adult. The implication for environmental health is that, by virtue of children's lower body weight, given the same exposures, they can receive significantly higher relative contaminant doses than adults.

DOH evaluated the likelihood of adverse health effects for young children assumed to be exposed to the detected contaminants in drinking water. No adverse health effects would be expected to result from exposure to these contaminants.

## **Conclusions**

1. No pesticides/herbicides were detected in either of the two wells tested.
2. A very low concentration of one PAH was detected in the residential well, and very low concentrations of three phthalates and two PAHs were detected in the school well. Concentrations of all of these compounds were below levels of health concern, and do not pose a health hazard.
3. Two inorganic compounds (lead and copper) were detected in the school well, but below a level of health concern.
4. Based on DOH's evaluation of all available site environmental sampling data, *there is no apparent public health hazard as a result of exposure to contaminants detected in either of the two wells tested.* The no apparent public health hazard category is used when human exposure to contaminated media is occurring, or has occurred in the past, but the exposure is below a level of health hazard.

### **Recommendations/Public Health Action Plan**

1. Because of the low PAH detection in the residential well, DOH recommends follow-up testing for PAHs. If testing is conducted, DOH is available to evaluate the results.
  - < The well owner was informed of the test results. DOH will provide a copy of this health consultation to the residents whose well was tested.
2. Because of the low PAH detections in the Griffin school well, follow-up testing should be conducted by the school for synthetic organic compounds (SOCs).
  - < Despite the previous SOC waiver issued to the school by DOH, follow-up testing for SOC's should be conducted because trigger levels were exceeded for two SOC's (diethylphthalate and di-n-butylphthalate). DOH is available to evaluate the results of such testing.

**Preparer of Report**



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## References

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9. Agency for Toxic Substances and Disease Registry, Division of Health Assessments and Consultations. Drinking Water Comparison Values. September 2000 update.
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13. United State Environmental Protection Agency. Exposure Factors Handbook. 1997.

## Appendix A

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**Figure 1**

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## Appendix B

**Table 1.** Chemical Detections in Residential Well  
(April 20, 2000)

Chemical/Analyte	Sample Concentration (: g/l)	Carcinogenic Health Comparison Value (: g/l)	Non Carcinogenic Health Comparison Value (: g/l)
Phenanthrene	0.086 (J)	NA (EPA Class D)	NA

NA = Not available

J = Estimated Value

: g/l = micrograms of chemical per liter of water (equal to one part per billion)

**Table 2.** Chemical Detections in Griffin School Well  
(April 20, 2000)

Chemical/Analyte	Sample Concentration (: g/l)	Carcinogenic Health Comparison Value (: g/l)	Non Carcinogenic Health Comparison Value (: g/l)
Acenaphthene	0.048 (J)	NA	600 (Child RMEG)
Phenanthrene	0.095	NA (EPA Class D)	NA
Dimethylphthalate	0.28 (J)	NA (EPA Class D)	16,000 (MTCA Method B)
Diethylphthalate	0.67	NA (EPA Class D)	3,000 (Child RMEG)
Di-n-butylphthalate	0.96	NA (EPA Class D)	1,000 (Child RMEG)
Copper	7.9	NA (EPA Class D)	1,300 (MCLG/EPA Action Level)
Lead	1.5	NA (EPA Class B2)	15 (EPA Action Level)

J = Estimated Value

Child RMEG = ATSDR's Reference Dose Media Evaluation Guide for child exposures

MTCA Method B = Washington State Department of Ecology Model Toxics Control Act Method B formula values for groundwater

MCLG = Federal Safe Drinking Water Act Maximum Contaminant Level Goal

NA = Not available

## Certification

This Health Consultation was prepared by the Washington State Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was begun.

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The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health consultation and concurs with the findings.

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